

# PATENT SPECIFICATION

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## (54) A STOPPER FOR A SUPPLY RESERVOIR FOR LIQUID

(71) We, SOCIETE ANONYME D.B.A., a French Body Corporate, of 98 Boulevard Victor Hugo, 92115—Clichy, France, do hereby declare the invention, for which we 5 pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates primarily to a stopper 10 per for a supply reservoir for liquid, more particularly a hydraulic fluid reservoir for a motor vehicle brake circuit.

It has already been proposed, more particularly in French patent specification 15 No. 1,194,139, a stopper for a supply reservoir for liquid, comprising a rigid cap capable of being fixed in a fluid-tight manner to the neck of a supply reservoir for liquid, the cap comprising an annular 20 projection adapted to face into the reservoir after fixing of the stopper to the neck and a boss coaxial with the projection, at least one hole traversing the cap between the boss and the projection, and a 25 deflector disc fixed to the boss and having its central portion an aperture through which the boss projects, the deflector being deformed resiliently during mounting of it on the cap so that it substantially forms a 30 portion of a sphere of which the concave side faces into the reservoir due to abutting co-operation between the deflector and the annular projection. In this known stopper the deflector which is made of rigid 35 material, does not bear in a fluid-tight manner on the annular projection, and dust and moisture can therefore enter the reservoir. Moreover, the baffle action of the deflector is insufficient to prevent liquid 40 from spraying out of the reservoir during abrupt acceleration or deceleration of the vehicle in which the reservoir is installed.

According to the invention there is 45 provided a stopper for a supply reservoir for liquid, comprising a rigid cap capable

of being fixed in a fluid-tight manner to the neck of said supply reservoir for liquid, the cap comprising an annular projection adapted to face into the reservoir after fixing of the stopper to said neck and a boss 50 coaxial with the projection, at least one hole traversing the cap between the boss and the projection, and a deflector disc mounted on the boss and having in its central portion an aperture through which the 55 boss projects, the deflector disc being deformed resiliently during mounting of it on the cap so that it substantially forms a portion of a sphere of which the concave side is adapted to face into the reservoir 60 after fixing of the stopper or said neck due to abutting co-operation between the deflector periphery and the annular projection, and wherein the deflector disc is made of elastomeric material, the periphery 65 of the convex face of the deflector disc being resiliently urged to bear in a fluid-tight manner on the annular projection, and the edges of the aperture abutting in a fluid-tight manner on the boss when the 70 central portion of the concave face of the disc is resting on a seat on an annular shoulder attached to the boss, the respective diameters of the boss in the vicinity of the annular shoulder and of the aperture being such that air under pressure 75 can escape from the supply reservoir through the aperture when the central portion of the concave face of the disc is clear of its seat on the shoulder attached to the 80 boss.

Thanks to the invention, the resilient deflector acts as a pair of non-return valves mounted between the reservoir and atmosphere for opposite directions of air flow. 85 Also, the differing flexibility of the deflector periphery and of its central portion allows the two "non return valves" to be differently calibrated.

In particular, fluid can flow much more 90

easily from the atmosphere into the reservoir than in the opposite direction.

The invention will be further described, by way of example, with reference to the accompanying drawing in which there is illustrated the neck of a hydraulic fluid reservoir 10 for a brake circuit, on to which a stopper 12 according to the invention is screwed. A sealing ring 14 makes this connection fluid-tight. The stopper consists chiefly of a moulded cap 16 of rigid material. The cap has a central boss 18 and an annular projection 20 coaxial with the boss, both of which project into the reservoir. The boss 18 contains a groove 22 capable of receiving a washer 24 made of rigid material, which is so positioned relative to the free end of the boss that a disc 26 of elastomeric material can deform resiliently to form a portion of a sphere, of which the concave side faces the reservoir interior. The periphery 28 of the convex face normally bears in a fluid-tight manner on the projection 20, whereas the edges of the aperture 30 in the central portion 31 of the disc rest in a fluid-tight manner on the boss 18, the central portion of the concave face of the disc being urged resiliently on to the washer 24, so as to normally rest on a shoulder defined by said washer. Lastly, a hole 32 is provided in the cap between the boss 18 and projection 20.

If the pressure in the reservoir drops during the repeated replenishment of the brake circuit, the periphery 28 of the disc bends easily so that a sufficient quantity of air can enter the reservoir in the direction of an arrow  $F_1$  without meeting appreciable resistance. In the event of excess pressure in the reservoir due to a temperature rise, the central portion of the disc rises, so that the trapped air can return to the atmosphere as indicated by an arrow  $F_2$ . When the vehicle moves abruptly, the fluid contained in the reservoir is sprayed on to the disc, so improving the seal where the disc 26 co-operates with the projection 20. However, since the central portion 31 of the disc is much more rigid than the disc periphery, the risk of the central portion 31 moving off its fluid-tight seat is small, and is further reduced by the washer 24 protecting the path between the boss 18 and aperture 30.

55 It will be appreciated that a stopper em-

bodimenting the invention is easy to make and to assemble.

WHAT WE CLAIM IS:—

1. A stopper for a supply reservoir for liquid, comprising a rigid cap capable of being fixed in a fluid-tight manner to the neck of said supply reservoir for liquid, the cap comprising an annular projection adapted to face into the reservoir after fixing of the stopper to said neck and a boss coaxial with the projection, at least one hole traversing the cap between the boss and the projection, and a deflector disc mounted on the boss and having in its central portion an aperture through which the boss projects, the deflector disc being deformed resiliently during mounting of it on the cap so that it substantially forms a portion of a sphere of which the concave side is adapted to face into the reservoir after fixing of the stopper to said neck due to abutting co-operation between the periphery of the deflector disc and the annular projection, and wherein the deflector disc is made of elastomeric material, the periphery of the convex face of the deflector disc being resiliently urged to bear in a fluid-tight manner on the annular projection, and the edges of the aperture abutting in a fluid-tight manner on the boss when the central portion of the concave face of the disc is resting on a seat on an annular shoulder attached to the boss, the respective diameters of the boss in the vicinity of the annular shoulder and of the aperture being such that air under pressure can escape from the supply reservoir through the aperture when the central portion of the concave face of the disc is clear of its seat on the shoulder attached to the boss.

2. A stopper as claimed in claim 1, characterized in that the shoulder is formed by a washer of rigid material force-fitted into a groove in the boss.

3. A stopper constructed and arranged substantially as herein described, with reference to and as illustrated in the accompanying drawing.

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